EPA

ORDER

Classification No.: 2180.2

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DATA STANDARDS FOR THE ELECTRONIC TRANSMISSION OF LABORATORY MEASUREMENT RESULTS

1. PURPOSE. The purpose of this Order is to issue standards for the electronic transmission of environmental measurement results from laboratories to EPA programs. These standards will provide a consistent definition of laboratory data and will facilitate cross-media use of laboratory data.

2. SCOPE. This Order applies to laboratories that supply measurement data for Agency, Regional or program office decisions.

3. BACKGROUND.

   a. Integration of information and databases is difficult because program offices use disparate formats and names for similar data elements.

   b. There is a need to make and support decisions based on standard information and data collected which cut across the Agency's programs.

   c. Specific programs have an increasing need to share data from other programs, other Agencies, States and local governments. This adds credence to the need for acceptable data standards to facilitate the exchange of information.

   d. Information technology has reached a point at which the sharing of data among automated systems is technically feasible.

   e. The Agency has implemented standards for hardware and software which facilitate the sharing of data among programs.

   f. Laboratory measurement results are commonly acquired by almost all the operating programs and Regions.

g. The large quantity of data that is received from laboratories mandates the use of automated systems of transmission to decrease errors of transcription, to increase the speed of reporting and to facilitate wide use of the data.

h. A standard approach to the transmission of laboratory data is required to ensure that all measurement data reported to Agency programs from laboratories will include common elements that define the sample type, the measurement technique and method, and the quality of the measurement, in addition to the measurement results.

i. These standards define data originally acquired for one specific purpose to other potential users. Use of these standards certifies the existence of qualifying information to second and third party users of the data.

4. AUTHORITIES.

a. 15 CFR, Part 6 Subtitle A, Standardization of Data Elements and Representations.

b. OMB Circular A-130, Management of Federal Information Resources.

5. POLICY. The Standards for Electronic Transmission of Laboratory Measurement Results in Appendices A through C to this Order will be used to move measurement results from laboratories to program offices.

a. Programs will adhere to the standards except where it can be demonstrated that the costs of using the standards exceed the benefits or will impede the Agency in accomplishing its mission.

b. These standards provide a framework that can be adapted to the needs of each program. Addition or deletion of data elements is permissible within the standards.

c. No timetables are set for conversion of existing automated data transfer mechanisms. The Office of Information Resources Management will ensure that new instances of the automated collection of laboratory measurement results will consider these standards as part of the workplan.

6. ASSISTANCE. Assistance in implementing this Order can be obtained from the Immediate Office, Office of Information Resources Management (OIRM).

7. PROVISION FOR WAIVER. OIRM recognizes that due to variances in mission needs, information requirements, and resource allocations, not all information systems can easily conform to the standards defined in this policy. In order to provide a reasonable amount of flexibility, this provision for waiver is included in the Order.

   a. An application for waiver should provide information to substantiate the problems encountered in adopting the standard. Also, the application should include the program's alternate plan of action for transmitting laboratory results.

   b. The application must be approved by the decision official in the requesting office and the respective Senior Information Resources Management Official prior to submission to the Director of OIRM, who has responsibility for final disposition. The applying office will be notified in writing of the disposition of the waiver within 30 days.

C. Morgan Kinghorn
Acting Assistant Administrator

CONTENTS OF APPENDICES

Appendix A

Format for Analytical Results Reports on Machine Readable Media

Introduction

This constitutes an EPA standard for media and record formats to be used in transmission of analytical results. The following points should be noted:

1. The standard describes transmission formats only. It is expected that processing systems will convert the input records into forms more convenient for storage and processing.

2. Spaces between fields permit these records to be prepared by programs written for laboratory automation systems in versions of BASIC which require this feature, as well as to be compatible with Agency standard statistical and database management systems (e.g., SAS, S2K, ADABAS, etc.).

3. Record formats contain sequence numbers and checksums to be consistent with requirements for a future error-free telecommunications format.

Media Format

The record formats are intended to be general for a variety of media, but some special considerations apply to certain media.

1. Magnetic Tapes shall be industry - standard 9-track, 800, 1600, or 6250 bits per inch, with no internal labels. Floppy diskettes shall be IBM-PC compatible and may be of any standard size. Telecommunications requirements will be defined as appropriate. Data compression or "squeezing" algorithms will be employed where appropriate for future telecommunications protocols.

2. Records shall be fixed-length 80-byte records consisting of ASCII characters. If the operating system producing the record requires an end-of-record code (such as carriage return and/or line feed), this code shall occupy record positions 79-80. Otherwise, positions 79-80 shall be blank.

3. Records on tape may be combined optionally into fixed-length blocks, with a blocksize not exceeding 4000 bytes. If the block includes a prefix or postfix supplied by the operating system in addition to the records, information about the presence and length of the prefix or postfix shall be included in the external label.

4. Tapes or diskettes shall consist of one or more files. Each tape file shall end with a tapemark; the last file on the tape shall end with two tapemarks. Diskettes shall have all files present in the root or parent directory.

5. Each tape reel or diskette shall bear one or more external labels, collectively supplying the following information: volume ID, number of files, creation date, and name, address and phone number of submitter. Magnetic tape labels shall also contain density, blocksize and recordsize. Individual Agency environmental monitoring programs may require additional external labels such as to provide linkage to other related data (e.g., field sampling data sheets or lab "chronicles").

6. The following media shall be compliant with Federal Information Processing Standards (FIPS) cited below:

FIPS	Subject
3	800 BPI, NRZI, 9-track tape
25	1600 BPI, PE, 9-track tape
50	6250 BPI, GCR, 9-track tape

Record Formats

There are six groups of record types in the standard, as shown below. Detailed record formats follow.

Type	Name	Contents
10	Run Header	Contains information pertinent to the whole production run (group, batch, etc. of samples or sample equivalents). See production run definition below.
20	Sample Header	Contains sample-identifying information or corresponding information for calibrations, QC samples, instrument performance checks, etc.
30	Results Record	Contains any final result on a sample, calibration or QC sample and identifying information.
40	Deleted Record	Signals a deleted record; record contents are undefined except for the record type code.
50	Special Record	Signals a header for other Agency Standard Data Base Records (e.g., STORET, SAROAD, SFC, AIRS, etc.).
90	Comments Record	Signals a record containing free-form comments.

Record types 10, 20 and 30 are mandatory, except when field sampling data only are being reported, in which case type 30 may be missing; other types are optional. Type 20, representing the sample, contains a Region and Sample ID which acts as an identifying label for the sample. The QC code indicates whether the data are from an environmental sample, calibration or QC sample; or other calculated run-wide data such as mean response factors. Type 30, representing an individual analyte, contains either a program or contract specified identifier or a CAS code and an indicator ("I" or "C" or another code) as to which code was used. Type 50 is used to include data from any other standard agency data base such as STORET or AIRS. It is required only when records from these other systems are being mixed with records from this standard. It should be noted that records which are optional in the standard may be considered mandatory in a given application (e.g., Contract Lab Program). See page C-5 for an example of the sequence of the record types.

Production Runs

Since, under this standard, a file contains the results for one production run, it is necessary to define a production run in terms applicable across a wide variety of analysis types. In general, a production run should represent a "group" or "batch" of samples that are processed in a continuous sequence under relatively stable conditions. Specific points characterizing a production run are:

- Calibration - initial and continuing checks. Typically all samples in a run use the same calibration data. (There will be a few exceptions, such as isotope dilution for GC/MS, where some of the calibration information is contained in each sample.)

- Method number - (see Appendix B) will be constant.

- Instrument conditions - are typically constant throughout a run. Results obtained on different instruments cannot be combined in one run.

The time span of a production run varies with the type of analysis. Many runs for inorganic analyses take a fraction of a day. Some organic analyses, such as GC and GC/MS, take a long time for each sample, so that the production run may contain data from many work shifts which could span days or weeks.

The first record in each file must be a record type 10, the Run Header. Positions 4-24 form an identifier for the run. Ignoring the blanks, this would read "840401152IGC/MS " for a GC/MS run started at 3:21 p.m. on April 1, 1984. If data from a single production run are split and reported on several files (presumably at different times), it is mandatory that this run identifier be identical on each such file. The measurement type is general and will be assigned by EPA. In runs completed during one work shift by one individual, the initials designate the responsible analyst. For runs which involve more than one instrument operator, it may be necessary to use the initials of a manager. In any case, the initials should indicate one individual responsible for the quality and consistency of the entire run.

Record Sequence (see page C-5)

1. A Run Header (type 10) record must be present as the first record in the file. Further occurrences of the type 10 record in the file are not allowed.

2. Each environmental sample, calibration or quality control sample is represented by a group composed of a type 20 and 21 record, which holds sample level identifying information, followed by one type 30 record for each method analyte or standard. The region/client and EPA sample ID together should uniquely identify a single sample, but there is no separate requirement that the sample ID be unique on a national level. The type 20 record holds a count for the number of method analytes being determined. Type 20 records should occur in the order in which analytical results were obtained. The type 20 records for quality control items have further rules (see Appendix B, for definitions of QC types):

   a. LD1 must occur before the corresponding LD2 record, but the two records need not be adjacent. (Similar rule for FD1 and FD2)

   b. LF1 must occur before the corresponding LF2 record, but the records need not be adjacent.

   In addition, a type 20 record is used as a header for any additional run-wide data that must be reported for each method analyte (such as detection limits or interelement correction factors). Unique identifiers given on page B-6 are used in place of "QC codes" to indicate the types of data that follow.

3. Type 50 records are used to indicate the presence of data in formats of other existing agency data bases and may occupy any position. Each contains a counter to indicate the number of records from the other system that follow.

4. Type 90 records may be defined to occupy any position except before the type 10 (header) record, or between records following a type 50.

File Record Integrity

All record types (excepting those following type 50) shall contain the following check fields to ensure file and record integrity:

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type or identifier	"10" or as appropriate
72-74	3	Record sequence number within file	000-999, repeated as necessary
75-78	4	Record checksum	Four hexadecimal digits; calculation algorithm to be supplied
79-80	2	Reserved for operating system use	Will contain blanks, or a code for CR and/or LF

Dates and Times

Wherever a date or time-of-day is required, the information consists of successive groups of two decimal digits each, separated by blanks. Dates are given in the order YY MM DD, and times as HH MM. All hours will be given as 0 to 23, right justified, using a 24 hour clock and will be local time. Since some computers generating the date and time sequence may have difficulty producing leading zeros, these will not be required. The program reading the file will convert leading blanks to leading zeros in all date and time fields.

Necessary Information

The exact list of reportable information will obviously vary considerably from one program to another. The information given on the following records is designed to be as general as possible, and not all of it will apply to any program or method. It is important to note that this standard is in no way attempting to determine, or even suggest, what data should or should not be reported for any given program; it is only defining how that data should be reported. Any data element that is not applicable should simply be left blank; if no data on a record type are applicable the entire record may be omitted. All of the definitions of the field contents should be considered to be general; specific programs and methods may further define any field, or may require the use of some fields to represent program or method specific information. Additional method dependent record types may be defined in the future to accommodate information which cannot be reported using the defined format.

Field Sampling Data

Field sampling data will also be reported using this standard. If the field sampling data are sent in separately, then the file will be structured in the same manner as an analytical analysis. There will be a type 10 record at the start which will have "FIELD" in columns 19-23 along with whatever information is appropriate. All type 20 records will have the appropriate field QC codes along with an appropriate sample qualifier, e.g., FLD". Much of the other information will be blank. Type 30 records will be present only if necessary (such as to report the amount of field spikes for each spiked analyte). If field sampling data are reported by the laboratory performing the analysis, using the same file, it will be necessary to have two type 20 records for each sample, one for the analytical results and one for field sampling data.

Multiple Volume Data

There is no requirement under this standard that all the data from an entire production run fit onto a single volume of the transmission medium. If data are being split into multiple volumes, then each program will define how this is to be performed. For example, if the multiple volumes are reported at different times, it may be necessary to repeat the transmission of all initial calibration data with each volume. On the other hand, if multiple volumes are utilized simply because all data will not fit onto a 360 K diskette, then there would be no need to repeat the initial calibration data on each volume. In all cases, the program will define when and where data may be split and how the files are to be named so that the sequence is unambiguous. What is necessary, is that all volumes start with a type 10 record, and that all type 10 records have the same run identifier as explained on page A-3. If it is necessary to split the data from a single sample into multiple volumes, then the type 20 (and following) type records for that sample must be repeated; in this situation, it is mandatory that columns 4-37, which collectively identify the sample, be identical in each volume.

General Instructions

1. All character data are to be upper case, except in comment fields where no restrictions are given or when using the symbols for chemical elements (one upper case letter or one upper case letter followed by a lower case letter).

2. Missing or unknown values are to be left blank.

3. All character fields are to be left justified.

4. All numeric fields are to be right justified. A decimal point is to be used with a non-integer if exponential notation is not used. Commas are not allowed.

5. All temperature fields are in centigrade and are presumed non-negative unless preceded by a minus sign (-).

Format of the Mandatory Production Run Header Record (Type 10)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"10"
3	1	blank	
		Positions 4 through 17 contain the date/time of the start of instrumental analysis.	Positions 4-24 constitute the run ID. See instructions for record type 10, page A-3.
4-5	2	Year	YY
6	1	blank	
7-8	2	Month	MM
9	1	blank	
10-11	2	Day	DD
12	1	blank	
13-14	2	Hour	HH
15	1	blank	
16-17	2	Minute	MM
18	1	blank	
19-24	6	Measurement Type or Agency Code	General descriptor (e.g., ICAP, GC/MS, ASTM, USGS); or
25	1	blank	"FIELD" if field data only.
26-30	5	Method Number	Standard number defined by
31	1	blank	EPA or other Agency. (see page B-1 for examples).
32-34	3	Person responsible for run	3 initials of Manager.
35	1	blank	
36-41	6	Lab ID	From EPA standard list or
42	1	blank	Project Officer.
		Positions 43-51 contain the date report prepared.	
43-44	2	Year	YY
45	1	Blank	
46-47	2	Month	MM
48	1	Blank	

Format of the Mandatory Production Run Header Record (Type 10) cont.

Record Position	Field Length	Field Contents	Remarks
49-50	2	Day	DD
51	1	Blank	
52-61	10	Contract Number	Agency standard number.
62	1	blank	
63-68	6	Instrument ID	e.g., GC8312; provided by contract lab; must be unique and permanent within lab.
69	1	blank	
70	1	Security code	"S" = secure, "U" = unsecure Other codes may be defined to comply with additional contract requirements.

Format of the Chromatography Record (Type 11)

Use: To describe Chromatograph conditions. Applies to a group of samples in a run. Will be present for any method involving chromatography.

Position: Follows type 10

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"11"
3	1	blank	
4-11	8	Commercial Column name	e.g. SP2330
12	1	blank	
13-16	4	Column Length in meters	e.g., 100 or 99.5 or 3.5
17	1	blank	
18-21	4	Column inside diameter in mm.	e.g., 2 or .3
22	1	blank	
23	1	Type of Injector	S = split
24	1	blank	L = splitless O = on column
25-26	2	Carrier Gas	Chemical Symbol
27	1	blank	e.g. He, Ar, N, H
28-30	3	Carrier Gas flow rate in mL/min or Cm/sec	nnn
31	1	blank	
32-33	2	Units code	"ML" or "CM"
34	1	blank	
35-37	3	Initial Column Temp. in degrees C	e.g., 50 or 300
38	1	blank	
39-42	4	Initial Temp. Holding Time in min.	XX.Y
43	1	blank	
44-45	2	Number of Column Temperature Programs	Integer number
46	1	blank	
47-48	2	First (or only) Column Temperature Program in degrees C/min	e.g., 8
49	1	blank	

Format of the Chromatography Record (Type 11) (cont.)

Record Position	Field Length	Field Contents	Remarks
50-52	3	First* Column Temp. in degrees C.	e.g., 250 or 350
53	1	blank	
54-57	4	First* Temp. Holding Time in min.	XX.Y

*Note: When Number of Column Temperature Programs is "1", positions 50-52 and 54-57 will hold the final column temperature and holding time, and no type 12 record will follow.

Format of the Chromatography Record (Type 12)

Use: Continuation of type 11. Used only if multiple ramp column temperature programs are employed.

Position: Follows the type 11 to which it applies.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"12"
3	1	blank	
4-14	11	Second Column Temperature Program	Use the same format as positions 47-57 of record type 11.
15	1	blank	
16-26	11	Third Column Temperature Program	Use the same format as positions 47-57 of record type 11.
27	1	blank	
28-38	11	Fourth Column Temperature Program	Use the same format as positions 47-57 of record type 11.
39	1	blank	
40-50	11	Fifth Column Temperature Program	Use the same format as positions 47-57 of record type 11.
51	1	blank	
52-62	11	Sixth Column Temperature Program	Use the same format as positions 47-57 of record type 11.

Format of the Mass Spectrometer Record (Type 13)

Use: To describe Mass Spectrometer conditions. Applies to a group of samples in a run. Will be present whenever mass spectrometry is used.

Position: Follows type 10

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"13"
3	1	blank	
4-9	6	Instrument model	First letter - manufacturer,
10	1	blank	1-5 characters for model.
11-13	3	Scan cycle time in sec.	1.3
14	1	blank	
15	1	Scan Type	R - Continuous Scan Range
16	1	blank	S - SIM - mass range given U - Unknown scan type N - SIM - # masses given
17-20	4	Initial Mass Value or Number of Masses	Integer mass value. Lowest mass for "R", "S", or "U" (above); or number of masses monitored for "N".
21	1	blank	
22-25	4	Final Mass Value	Highest mass for "R", "S", or "U"; or blank for "N".
26	1	blank	
27-29	3	Pos. or Neg. ions	"POS" or "NEG"
30	1	blank	
31	1	Type of Instrument	M - magnetic, Q - quadrupole
32	1	blank	Other types may be defined
33-38	6	Mass Spectrometer Resolution or Peak Width *	Integer resolution value
39	1	blank	
40-41	2	Ionization Mode	FA, FD, FI, EI, TS, CI, AP
42	1	blank	
43-49	7	Reagent Gas	Chemical symbol or formula e.g., He, CH4, C8H18, NH3

*(Defined as M/delta M for magnetics, Peak Width in amu for Quads)

Format of the AA/ICAP Instrument Record (Type 14)

Use: To describe AA/ICAP instrument conditions. Applies to a group of samples in a run. Will be present whenever AA/ICAP is used.

Position: Follows type 10

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"14"
3	1	blank	
4-9	6	Instrument model	First letter - manufacturer,
10	1	blank	1-5 characters for model
11-15	5	Initial Wavelength in nm	e.g., 5000
16	1	blank	
17-21	5	Final Wavelength in nm	
22	1	blank	
23-28	6	Gas utilized	Chemical symbol or formula,
29	1	blank	e.g., C2H2,, NO
30-32	3	Flow rate magnitude	
33	1	blank	
34-35	2	Flow rate units	
36	1	blank	
37-39	3	Other gas added	e.g., AIR
40	1	blank	
41-43	3	Flow rate magnitude	Assumes same units as in
44	1	blank	Positions 34-35.
45-47	3	Digestion time	
48	1	blank	
49-51	3	Digestion temperature	
52	1	blank	
53-58	6	Acid used	e.g., H2SO4 or HNO3
59	1	blank	
60-64	5	Oxidizer used	e.g., H2O2
65	1	blank	
66-70	5	Other digestion options	Program may assign a code, e.g., SW846 digestion method.

Format of the Mandatory Sample Header Data Record (Type 20)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"20"
3	1	blank	
4-5	2	Region or other client	Alphanumeric
6	1	blank	
7-14	8	EPA Sample I.D.	Raw Sample ID only;
15	1	blank	no suffixes
16	1	Sample Medium/Matrix Code (Z)	See page B-9. Examples are
17	1	blank	found in Appendix C.
18-20	3	QC code	Codes type of data to be
21	1	blank	reported; see page B-2
22-24	3	Sample Qualifier	Code to qualify the results
25	1	blank	of the entire sample analysis (see page B-10).
26-33	8	Project number	e.g., Case # for Contract
34	1	blank	Laboratory Program.
35-37	3	Batch/shipment number	Alphanumeric
38	1	blank	
		Positions 39 through 52 contain the date/time of instrument analysis.	Field samples use date of sample collection.
39-40	2	Year	YY
41	1	blank	
42-43	2	Month	MM
44	1	blank	
45-46	2	Day	DD
47	1	blank	
48-49	2	Hour	HH
50	1	blank	
51-52	2	Minute	MM
53	1	blank	
54	1	Work shift of sample analysis	"G", "D" or "S" for:
55	1	blank	graveyard, day, swing.

Format of the Mandatory Sample Header Data Record (Type 20) cont.

Record Position	Field Length	Field Contents	Remarks
56	1	Sample Units Code	"L" = liters "C" = cubic meters "K" = kilograms (wet wt.)
57	1	blank	
58-65	8	Sample Size	See note.
66	1	blank	
67-69	3	Analyte count	Numeric; 1-3 decimal digits.

Note: Sample Size is the volume in liters for liquids, the volume in cubic meters for air and the wet weight in kilograms for solids. The Sample Units Code indicates which units are in use for the current sample.

Format of the Sample Header Data Record (Type 21)

Use: Continuation of type 20.

Position: Follows the type 20 to which it applies.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"21"
3	1	blank	
4	1	Method Variation Code (N)	Codes any sample method variations. See Appendix C.
5	1	blank	
6	1	Concentration level	Indicates possible method variations. (See Note 1) "L" = low "M" = medium "H" = high
7	1	blank	
8-10	3	Clean-up or other sample processing variation	Codes to be used will be defined by each program.
11	1	blank	
12	1	Extraction code	As defined in contract.
13	1	blank	
14-16	3	Initials of operator	Use whomever is responsible for the sample results.
17	1	blank	
18-23	6	General Administrative Reporting Number	Alphanumeric; e.g., S.A.S. Number for CLP program (if necessary).
24	1	blank	
25-35	11	Laboratory Data File Name*	File name in instrument data system or other descriptor.
36	1	blank	
		Positions 37 through 44 contain the date/time that sample preparation began.	
37-38	2	Year	YY
39	1	blank	
40-41	2	Month	MM
42	1	blank	
43-44	2	Day	DD
45	1	blank	

Note 1: The Concentration level is an estimate of overall level for all analytes.

* The file name is the identifying code for sample data in a laboratory data system. In laboratories without data systems, the file name will be any code used for sample data identification.

Format of the Sample Header Data Record (Type 21) cont.

Record Position	Field Length	Field Contents	Remarks
46	1	Work shift for sample prep	"G", "D" or "S" for: graveyard, day, swing.
47	1	blank	
		Positions 48-55 contain date sample received at lab.	
48-49	2	Year	YY
50	1	blank	
51-52	2	Month	MM
53	1	blank	
54-55	2	Day	DD
56	1	Blank	
57-63	7	Source of Compound (if not unknown sample)	Company or EPA from which compound was obtained.
64	1	blank	
65-70	6	Volume of Sample Analyzed; Units determined by Contract	50 or 0.5; e.g., Injection Volume in uL for CLP.

Format of the Sample Conditions Record (Type 22)

Use: Continuation of type 20. Used to describe additional sample conditions.
Position: Follows the type 20 and 21 to which it applies.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"22"
3	1	blank	
		Positions 4-17 contain the date/time of associated calibration. See Note 1. (Date of Source of the response factors used)	
4-5	2	Year	YY
6	1	blank	
7-8	2	Month	MM
9	1	blank	
10-11	2	Day	DD
12	1	blank	
13-14	2	Hours	HH
15	1	blank	
16-17	2	Minute	MM
18	1	blank	
19-29	11	Calibration data File Name*	See Note 2. Data File Name of associated calibration or "AVERAGE" in positions 21-27 (if mean used).
30	1	blank	
31-34	4	Sample pH	XX or XX.X
35	1	blank	
36-37	2	Percent moisture	For organic, dioxin
38	1	blank	
39-40	2	Decanted percent moisture	For organic dioxin
41	1	blank	

Note 1: For average, use the date and time average was calculated.
Note 2: This field must match positions 25-35 of record type 21 for the associated QC injection.

* The file name is the identifying code for sample data in a laboratory data system. In laboratories without data systems, the file name will be any code used for sample data identification.

Format of the Sample Conditions Record (Type 22) cont.

Record Position	Field Length	Field Contents	Remarks
42-46	5	Extract Volume in ml.	e.g. 1.0 or 0.050
47	1	blank	
48-54	7	Concentration/dilution factor	e.g., 2000 or .001
55	1	blank	
56-59	4	Method Detection Limit Method	Established per project by Project Officer.
60	1	blank	
61	1	Code for quantification report type	Program will specify when desired.
62	1	blank	
63-70	8	Sample Dry Weight or percent solids	If necessary, contract will define required value.

Format of the Associated Injection and Counter Record (Type 23)

Use: Continuation of type 20. Used to identify associated QC injections and to provide for program specific counters. May not be required in all programs.

Position: Follows the type 20, 21, and 22 to which it applies.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"23"
3	1	blank	
4	1	Type of First QC Injection	Identifies injection type. "P" - performance check, "B" - blank, etc. Other codes may be defined.
5	1	blank	
		Positions 6 through 19 contain date/time of associated QC injection. (Acquisition date and time of QC injection to be linked with this sample.)	
6-7	2	Year	YY
8	1	blank	
9-10	2	Month	MM
11	1	blank	
12-13	2	Day	DD
14	1	blank	
15-16	2	Hour	HH
17	1	blank	
18-19	2	Minute	MM
20	1	blank	
21-31	11	QC injection File Name*	See Note 1.
32	1	blank	
33	1	Type of Second QC Injection	Identifies Second injection type; same as position 4.
34	1	blank	

Note 1: This field must match positions 25-35 of record type 21 for the associated QC injection.

* File name is the identifying code for sample data in a laboratory data system. In laboratories without data systems, the file name will be any code used for sample data identification.

Format of the Associated Injection and Counter Record (Type 23) cont.

Record Position	Field Length	Field Contents	Remarks
		Positions 35 through 49 contain the date/time of associated QC injection. Positions 33 to 60 have the same format as positions 4 to 31 for the second type of QC injection. If more than two types of injections must be linked with the sample then use additional records.	
35-36	2	Year	YY
37	1	blank	
38-39	2	Month	MM
40	1	blank	
41-42	2	Day	DD
43	1	blank	
44-45	2	Hour	HH
46	1	blank	
47-48	2	Minute	MM
49	1	blank	
50-60	11	QC Injection File Name*	
61	1	blank	
62	1	Description Code of First Counter	Program may define any necessary sample-wide counters to be reported here.
63	1	blank	
64-65	2	First Counter	nn
66	1	blank	
67	1	Description Code of Second Counter	Two counters may be entered on each record.
68	1	blank	
69-70	2	Second Counter	

* The file name is the identifying code for sample data in a laboratory data system. In laboratories without data systems, the file name will be any code used for sample data identification.

Format of the Field Sampling Auxilliary Data Record (Type 24)

Use: Continuation of type 20. Used for Field Sampling Data to describe additional sample conditions.

Position: Follows the type 20 and 21 to which it applies.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"24"
3	1	blank	
4-39	36	Project Name	
40	1	blank	
41-55	15	Sample Station Number	From Standard List.
56	1	blank	
57	1	Type of Sample	G grab; T time composite;
58	1	blank	S space composite
59-61	3	Preservative Added	From standard list - blank
62	1	blank	if none.
		Positions 63 through 70 contain the date the sample was shipped to the lab.	
63-64	2	Year	YY
65	1	blank	
66-67	2	Month	MM
68	1	blank	
69-70	2	Day	DD

Format of the Field Sampling Auxilliary Data Record (Type 25)

Use: Continuation of type 24. Used for Field Sampling Data for additional descriptive information - exact format defined by each program.

Position: Follows the type 24 to which it applies.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"25"
3	1	blank	
4-36	33	Station Name, Location, and/or Description	Field contents and formats may be defined further by the individual program.
37	1	blank	
38-70	33	Names of Samplers	As above. May also contain chain-of-custody data.

Format of the Field Sampling Auxilliary Data Record (Type 26)

Use: Continuation of type 24. Used for Field Sampling Data to record any numerical values which indicates where or how the sample was collected. The exact format is defined by each program.

Position: Follows the type 24 to which it applies. (Record will only be required for some programs.)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"26"
3	1	blank	
4-6	3	Description of First Value	Program specified descriptor, e.g., "FLW" - flow rate; "TMP" - temperature; "LAT" - latitude; "LON" - longitude; "ALT" - altitude.
7	1	blank	
8-11	4	Magnitude of First Value	Fixed or Scientific notation (XXXXEYYY). Program will define appropriate measurement and applicable units.
12	1	blank or 'E'	
13-15	3	Exponent	Blank field will be interpreted as "+000".
16	1	blank	
17-19	3	Description of Second Value	Each value has the same format as positions 4-15. Up to five values may be given on each record. Additional records may be added if necessary.
20	1	blank	
21-24	4	Magnitude of Second Value	
25	1	blank or 'E'	
26-28	3	Exponent	
29	1	blank	
30-32	3	Description of Third Value	
33	1	blank	
34-37	4	Magnitude of Third Value	
38	1	blank or 'E'	
49-41	3	Exponent	
42	1	blank	

Format of the Field Sampling Auxilliary Data Record (Type 26) cont.

Record Position	Field Length	Field Contents	Remarks
43-45	3	Description of Fourth Value	
46	1	blank	
47-50	4	Magnitude of Fourth Value	
51	1	blank or 'E'	
52-54	3	Exponent	
55	1	blank	
56-58	3	Description of Fifth Value	
59	1	blank	
60-63	4	Magnitude of Fifth Value	
64	1	blank or 'E'	
65-67	3	Exponent	

Format of the Results Data Record (Type 30)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"30"
3	1	blank	
4	1	Type of Identifier Used	"I" = General Identifier (e.g. chemical symbol, program code). "C" = CAS Registry Number. Other codes may be defined.
5	1	blank	
6-14	9	Identifier Code or CAS #	Identifier codes may only be used when no acceptable CAS # exists. (Use right justification in either case.)
15	1	blank	
16-24	9	Identifier Code or CAS # of internal standard utilized.	For internal standard, if measurement uses internal standards; otherwise leave blank.
25	1	blank	
26-30	5	Units of measure	Established per project by Project Officer.
31	1	blank	
32-34	3	Non-numeric result	See page B-10; also called a result qualifier.
35	1	blank	
36-41	6	Numeric analytical result	Fixed point or scientific notation.
42	1	blank or 'E'	
43-45	3	Exponent	
46	1	blank	
47	1	Calculated Value Descriptor	Describes following value: "S" - surrogate; "F" - spiked analyte; "N" - # of points in mean. Other codes may be defined.
48	1	blank	
49-54	6	Related Calculated Value	Value represents amount added or other calculated or theoretical value. Format same as 36-46.
55	1	blank or 'E'	
56-58	3	Exponent	
59	1	blank	
60	1	QC or Limit Value Descriptor	Describes following value: "D" - method detection limit "S" - surrogate % recovery.
61	1	blank	
62-66	5	Related QC or Limit Value	Value is method detection limit; surrogate % recovery; or other type defined by the appropriate program.
67	1	blank or 'E'	
68-70	3	Exponent	

Format of the Instrumental Data Readout Record (Type 31)

Use: To describe a specific instrument readout value (raw data), for a specific sample where both the instrument setting and the associated value must be reported; exact nature of the value will be program dependent.

Position: Follows type 30. (Record will only be required for some programs.)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"31"
3	1	blank	
4	1	Type of Data	Code for description of property being measured or Instrument Setting; e.g., M - mass (GC/MS), or W - wavelength in nm.
5	1	blank	
6	1	Type of Value Recorded	Code for Value Recorded; e.g., A - area, B - absorbance, H - height, P - percent abundance, I - intensity.
7	1	blank	
8	1	Method of Data Entry	C - computer, M - manual (could be a sequence #).
9	1	blank	
10-17	8	First Instrument Setting	e.g., 320 or 320.0736 for mass, or 4973.61 for wavelength.
18	1	blank	
19-28	10	First Instrument Value	Up to 10 decimal digits.
29	1	blank	
30-37	8	Second Instrument Setting	Up to three readouts may be given on each record provided that positions 4, 6 and 8 are the same for all.
38	1	blank	
39-48	10	Second Instrument Value	
49	1	blank	
50-57	8	Third Instrument Setting	
58	1	blank	
59-68	10	Third Instrument Value	

Format of the Auxilliary Data Record (Type 32)

Use: To describe qualifying data for calibration or analytes in samples. Indicates where in the analysis data are located or how data were found or measured. CLP program will report analyte scan number and retention time (in minutes). Other projects may use this record for any numerical sample qualifying data.

Position: Follows type 30. (Record will only be required for some programs.)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"32"
3	1	blank	
4-5	2	Match Score (if matching of any sort was utilized)	0 to 99%; e.g., used for tentatively identified compounds in GC/MS
6	1	blank	
7	1	Match Score Specifier	How score was obtained; one alphabetic char; program will specify code when it is appropriate.
8	1	blank	
9-10	2	Description Code of First Value	Program specified descriptor, e.g., "RT" for GC/MS retention time; "IT" for integration time; "QM" for quantitation mass.
11	1	blank	
12-17	6	Magnitude of First Value	Fixed or Scientific notation as in Record Type 30. Program will define appropriate measurement and applicable units.
18	1	blank or 'E'	
19-21	3	Exponent	
23-24	2	Description Code of Second Value	Each value has the same format as positions 9-21. Up to four values may be given on each record. Additional records may be added if necessary.
25	1	blank	
26-31	6	Magnitude of Second Value	
32	1	blank or 'E'	
33-35	3	Exponent	
36	1	blank	

Format of the Auxillary Data Record (Type 32) cont.

Record Position	Field Length	Field Contents	Remarks
37-38	2	Description Code of Third Value	
39	1	blank	
40-45	6	Magnitude of Third Value	
46	1	blank or 'E'	
47-49	3	Exponent	
50	1	blank	
51-52	2	Description Code of Fourth Value	
53	1	blank	
54-59	6	Magnitude of Fourth Value	
61	1	blank or 'E'	
61-63	3	Exponent	

Format of the Name Record (Type 33)

Use: To carry an analyte name and any other necessary identifying information Different programs may define further information to be reported.

Position: Follows type 30. (Record will only be required for some programs.)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record type	"33"
3	1	blank	
4-70	67	Name of compound	Different programs may define this field further.

Format of the QC Limit Record (Type 34)

Use: To report QC limit values that were in effect for the indicated measurement, or for the entire production run, depending on program requirements.

Position: Follows type 30. (Record will only be required for some programs.)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record Type	"34"
3	1	blank	
4-7	4	Type of data present	QC chart type, or any other descriptor. See page B-8.
8	1	blank	
9-11	3	Type of Value(s) present	Limit Type (MIN, MAX, A, B, LWL, LCL, AVE, UCL, UWL), or other descriptor. See page B-8.
12	1	blank	
13	1	Method for calculating limit	M = manual, C = computer Other codes may be defined.
14	1	blank	
15-22	8	Instrument Setting	Only if appropriate; (e.g. wavelength value).
23	1	blank	
24-29	6	First QC or Limit Value	May be a mean. Use fixed or scientific notation.
30	1	blank or 'E'	
31-33	3	Exponent	
34	1	blank	
35-40	6	Second QC or Limit Value	May not be necessary. Use format of positions 24-29.
41	1	blank or 'E'	
42-44	3	Exponent	
45	1	blank	
46-51	6	Standard Deviation	
52	1	blank or 'E'	
53-55	3	Exponent	
56	1	blank	
57-59	3	Number of points used for mean	Integer.
60	1	blank	

Format of the QC Limit Record (Type 34) cont.

Record Position	Field Length	Field Contents	Remarks
		Positions 61 through 68 contain the date the QC limits were computed.	
61-62	2	Year	YY
63	1	blank	
64-65	2	Month	MM
66	1	blank	
67-68	2	Day	DD

Format of the Correction Data Record (Type 35)

Use: To record any correction data required. Different programs may define further information to be reported.

Position: Follows type 30. (Record may be required only for some programs.)

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record Type	"35"
3	1	blank	
4-6	3	Type of Correction	"ICP" for ICP interelement correction factors.
7	1	blank	
8-12	5	Type of Value or Units	If necessary - describes factor or gives units.
13	1	blank	
		Positions 14 through 22 contain the date the factor was determined.	
14-15	2	Year	YY
16	1	blank	
17-18	2	Month	MM
19	1	blank	
20-21	2	Day	DD
22	1	blank	
23-31	9	CAS # of interfering element	
32	1	blank	
33-40	8	Instrument setting in nm	Wavelength for ICP
41	1	blank	
42-47	6	Correction factor	Use fixed or scientific notation.
48	1	blank or 'E'	
49-51	3	Exponent	

Contents of rest of record may be defined further by other programs.

Format of the Deleted Data Record (Type 40)

Use: To delete any record.

Position: May occur anywhere.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record Type	"40"
3	1	blank	
4-70	67	Contents undefined	

Note: Any record type may be logically deleted by changing Record Type field to "40". Remaining contents of record are unchanged and should be ignored by all processing software.

Format of the Special Data Record (Type 50)

Use: To indicate the presence of any data records from other Agency Data Base Systems (e.g., STORET, AIRS, etc). This record may be used to report data in any other format without having to convert the data.

Position: May occur anywhere.

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record Type	"50"
3	1	blank	
4-12	9	EPA (or other agency) Project Type	e.g., STORET, SAROAD, AIRS, SFC
13	1	blank	
14-18	5	Counter	Indicates the number of records from the indicated system that will follow.
19	1	blank	
20-70	51	Comments	Any free-form comments may appear here.

This record is necessary only if records from another system are being mixed with records from this standard. The record may appear multiple times if data from more than one additional system are present, or if all such data are not contiguous. The counter will give the number of records in the alternate format that follow. These alternative records have no defined format within this standard, and therefore no check for any contents will be made. Record types, sequence numbers, and checksums will not be present in the expected fields, and the sequence number counter will simply ignore these records. Processing programs are expected simply to pass these records as received to the appropriate system.

Format of the Comment Record (Type 90)

Use: To provide any other necessary comments. Different programs may define this further and may require its presence in various places.

Position: May occur anywhere (see above).

Record Position	Field Length	Field Contents	Remarks
1-2	2	Record Type	"90"
3	1	blank	
4-70	67	Any Comment	Any program may use this record for any purpose and may further define field contents.

Appendix B

Definitions of Various Codes

STRUCTURE OF THE METHOD NUMBER

The Method Number

The method number is a five character alphanumeric code. The purpose of the method number is to define concisely the target analytes and the details of the method of analysis. The method number has the form:

XXXXY

Where:

XXXX defines one or more target analytes plus the analytical method. This part of the code is identical with the method numbers defined in EPA methods manuals, the code of Federal Regulations and the private standard setting organizations, e.g., ASTM.

Y is an alphanumeric modifier which specifies that an allowed option in the method has been implemented or specifies fractions of analytes in the method. The defined values of Y are dependent on the value of XXXX, that is, a Y = 5 in the 200 series methods may have a different meaning than Y = 5 in the 300 series methods. As an example, Y may distinguish total and dissolved phosphorus measured by the same method but with or without the optional method filtration. Another example is the use of Y to distinguish the acid and base/neutral fractions in method 625. If Y is not defined in a method, the default value is one.

The method number is validated as alphanumeric for XXXX and Y. It is stored right justified in the 5 digit method number field. Appendix C gives examples for organic and inorganic analyses.

Quality Control and Related Codes (QCC) in Type 20 Records

Note: These QCC appear in the QC code fields of type 20 records. They are used to indicate the type of data that are being reported. See page A-12.

QCC	Name	Definition
LD1	LABORATORY DUPLICATE FIRST MEMBER	The first of two aliquots of the same environmental sample. Each aliquot is treated identically throughout a laboratory analytical procedure; and each is carried through the entire laboratory analytical method as applied to all other samples analyzed with the same method.
LD2	LABORATORY DUPLICATE SECOND MEMBER	The second of the two aliquots described under LD1.
LD3 to LD9	LABORATORY REPLICATE Nth MEMBER	The 3rd through the 9th additional aliquots which logically follow LD1 and LD2. If more than two aliquots are used, all names are changed from duplicates to replicates. Codes do not change.
LRB	LABORATORY (REAGENT) BLANK	An aliquot of reagent water or equivalent neutral reference material treated as an environmental sample in all aspects in the laboratory including addition of all reagents, internal standards, surrogates, glassware, apparatus, equipment, solvents, and analyses.
LDB	LABORATORY (DRY) BLANK	Exactly the same as the LRB except the aliquot of reagent water or equivalent neutral reference material is omitted.
LSB	LABORATORY (SOLVENT) BLANK	Exactly the same as the LDB except any internal standards or surrogates are omitted.
LCB	LABORATORY CALIBRATION BLANK	An aliquot of reagent water, possibly adjusted in pH, but without addition of other reagents.
LCM	LABORATORY CONTROL SOLUTION	An aliquot of reagent water or equivalent neutral reference material to which a known quantity(s) of method analyte(s) was added in the laboratory. The LCM is treated as an environmental sample in all aspects in the laboratory including addition of all reagents, internal standards, surrogates, glassware, equipment, solvents, and analyses.
LVM	LABORATORY CALIBRATION VERIFICATION SOLUTION	Exactly like LCM; used for calibration verification.

QCC	Name	Definition
LIM	LABORATORY INTERFERENCE CHECK SOLUTION	Exactly like LCM; used to verify inter-eleme background correction factors.
LFM	LABORATORY FORTIFIED BLANK	An aliquot of sample matrix, known to be belo tection limits for an analyte(s), to which a k quantity(s) of method analyte(s) was added. Tr LFM is treated as an environmental sample in al aspects in the laboratory including addition of reagents, internal standards, surrogates, glass- ware, equipment, solvents, and analyses.
LSO	LABORATORY SPIKED SAMPLE BACKGROUND (ORIGINAL) VALUES	An environmental sample which is analyzed accordi to the analytical method, and a single independent aliquot of the same sample is taken for fortifica- tion (spiking) with the method analyte(s).
LSF	LABORATORY SPIKED SAMPLE - FINAL VALUES	An environmental sample in which the analyte(s) was measured in an independent sample aliquot before spiking (LSO), a known concentration increment was made, and the measurement(s) of the final concen- tration(s) were made according to the analytical method (LSF).
LDO	LABORATORY DILUTED SAMPLE BACKGROUND (ORIGINAL) VALUES	An environmental sample which is analyzed according to the analytical method, and a single independent aliquot of the same sample is taken and diluted according to the analytical method.
LDF	LABORATORY DILUTED SAMPLE - FINAL VALUES	An environmental sample in which the analyte(s) were measured in an independent sample aliquot before dilution (LDO), a known dilution was made, and the measurement(s) of the final concentration(s) were made according to the analytical method (LDF).
LSD	LABORATORY SPIKE DUPLICATE	An environmental sample exactly like the LSO except that two independent aliquots of the same sample are taken for fortification (spiking) with the method analyte(s).
LF1	LABORATORY SPIKED SAMPLE - FINAL - FIRST MEMBER	An environmental sample exactly like the LSF except that duplicate aliquots were spiked, and the measurement(s) of the final concentration was made according to the analytical method (LF1).
LF2	LABORATORY SPIKED SAMPLE - FINAL - SECOND MEMBER	The second member of the LF1/LF2 duplicate pair.

QCC	Name	Definition
LPS	LABORATORY CONFIRMATORY SCAN	The measurement of the spectrum or partial spectrum of an analyte(s) in an environmental sample or extract to obtain additional qualitative evidence when the analyte(s) identification and measurement were obtained from other techniques.
LPC	LABORATORY PERFORMANCE CHECK SOLUTION	A solution of method analyte(s), surrogate(s) and/or internal standard(s) used to evaluate the performance of an instrument with respect to a defined set of criteria.
LDX	LABORATORY DOUBLE PURPOSE PRECISION AND ACCURACY SAMPLE	An environmental sample which is used for both the LSO (background level before spike) and LD1 (first member of a duplicate).
CAL	CONCENTRATION CALIBRATION SOLUTION (Type Unspecified)	A solution of method analyte(s) used to calibrate the instrument response in terms of concentration of analyte(s). Response factors rather than concentrations will be reported on the following type 30 records.
CLM	INITIAL CALIBRATION - MULTI POINT	A calibration solution as above used to determine the initial calibration of an entire production run where a group of calibrations are required at different levels of method analyte concentrations.
CLS	INITIAL CALIBRATION - SINGLE POINT	Exactly the same as CLM except only a single level of method analyte concentrations are utilized.
CLC	CONTINUING CHECK CALIBRATION	A calibration solution as above used to verify whether the initial calibration data are still currently valid. Will be run several times throughout the duration of the production run.
CLD	DUAL PURPOSE CALIBRATION	A calibration solution as above used both as an initial calibration (CLM or CLS) and a continuing check (CLC).
IDL	INSTRUMENT DETECTION LIMIT SOLUTION	A calibration solution (not necessarily the same solution as above), where the data are to be used to calculate instrument detection limits only.
blank		Unknown sample, not associated with any quality control item.

The following QCC will only apply to field data.

QCC	Name	Definition
FD1	FIELD DUPLICATE - FIRST MEMBER	The first of two environmental samples taken at the same time and place under identical circumstances. Each sample is treated identically throughout field and laboratory analytical procedures; and each is carried through the entire laboratory analytical method as applied to all other samples analyzed with the same method.
FD2	FIELD DUPLICATE - SECOND MEMBER	The second of the two samples described under FD1.
FRB	FIELD BLANK	An aliquot of reagent water or equivalent neutral reference material treated as an environmental sample in all aspects in both the field and the laboratory including addition of all preservatives, reagents, internal standards, surrogates, glassware, apparatus, equipment, solvents and analyses.
FCM	FIELD CONTROL SOLUTION	An aliquot of reagent water or equivalent neutral reference material to which a known quantity(s) of method analyte(s) was added in the field. The FCM is treated as an environmental sample in all aspects in both the field and the laboratory, including addition of all preservatives, reagents, internal standards, surrogates, glassware, equipment, solvents and analyses.
FRM	FIELD REFERENCE SOLUTION	An aliquot of a sample (submitted by the requestor) having a certified value. These samples are usually obtained from the NBS, EMSL, etc. The concentration measured by the same analytical procedure used for other samples is the "found" value.
FFM	FIELD FORTIFIED BLANK	An aliquot of sample matrix, known to be below detection limits for an analyte(s), to which a known quantity(s) of method analyte(s) was added in the field. The FFM is treated as an environmental sample in all aspects in the field and in the laboratory, including addition of all preservatives, reagents, internal standards, surrogates, glassware, equipment, solvents and analyses.

QCC	Name	Definition
FSO	FIELD SPIKED SAMPLE BACKGROUND (ORIGINAL) VALUES	An environmental sample which was split in the field. The portion represented by FSO is analyzed according to the analytical method without fortification (spiking).
FSF	FIELD SPIKED SAMPLE - FINAL VALUES	The second portion of the environmental sample which was split in the field, and to which a spike was added in the field with a known concentration increment. The measurement(s) of the final concentration(s) was made according to the analytical method (FSF).

The following QCC values do not refer to actual samples or calibrations for which laboratory results are obtained. Instead they are used on type 20 records which act as a header and indicate that additional (usually calculated) analyte specific data will be present on type 30 (and following type) records. Usually these data will apply to an entire production run, in which case they will appear immediately following the type 10 record. If the data apply to only a portion of the samples in the run, they should be placed immediately preceding the samples to which they applies. Much of the rest of the information in the type 20 record may be blank, indicating that this data does not apply to these results. Many of these codes are method specific, and more codes will be added as additional methods require additional data.

MNC	MEAN VALUES FROM CALIBRATIONS	The data following represent mean values and percent RSD's from several calibration solutions. Data will be present for each method analyte for which a mean has been determined.
SID	SAMPLE INDEPENDENT (i.e. INSTRUMENT) DETECTION LIMITS	The data following represent sample independent detection limits for each method analyte calculated according to the method being utilized.
ICF	INTER-ELEMENT CORRECTION FACTORS	The data following represent ICP interelement correction factor measurements for each method analyte.
SDR	SPIKE/DUPLICATE CALCULATED RESULTS	The data following represent calculated QC results for any QC samples involving multiple injections. Data will consist of percent recoveries and the percent RSD values for each appropriate method analyte that was analyzed according to the analytical method.

Laboratory Quality Control Codes Which Do Not Involve Real Samples

QC Code	Name	I/O	Internal Stds	Surrogates	Clean Matrix Present	Clean Matrix Analyzed	Clean Matrix Spiked
LRB	Lab Reagent Blank	O	yes	yes	yes	yes	no
LRB	Lab Reagent Blank	I	no	no	yes	yes	no
LDB	Lab Dry Blank	O	yes	yes	no	N/A	N/A
LSB	Lab Solvent Blank	O	no	no	no	N/A	N/A
LCB	Lab Calibration Blank	I	no	no	yes	yes	no
LFM	Lab Fortified Blank-Measured	O	yes	yes	yes	no	yes
LCM	Lab Control Solution Measured	I	no	no	yes	no	yes

NOTE 1: All except LCB prepared in the laboratory and treated exactly like a sample for the value being measured, including all preanalysis treatments.

NOTE 2: Entries in I/O column: I = inorganic, O = organic

NOTE 3: LVM and LIM differ from LCM in their QC role in the run.

Quality Control Codes in Type 34 Records

Note: Type 34 records are used to record the limit values which were in force during the run. Other programs may define other codes. All codes should be left justified.

Record Field	Code	Meaning
QC Chart Type	LSPK	Statistical data from Laboratory Spikes
	LSSP	Statistical data from Laboratory Surrogate Spikes
	LRBL	Statistical data from Laboratory Reagent Blanks
	LDUP	Statistical data from Laboratory Duplicates
	LCST	Statistical data from Laboratory Control Standards
Limit Type	A	Critical Range (R_C) Slope
	B	Critical Range (R_C) Intercept
		Note: Upper limit for duplicates is expressed by the critical range linear equation: $R_C = AX + B$
	MIN	Minimum concentration for which duplicates limit is applicable
	MAX	Maximum concentration for which duplicates limit is applicable
	LCL	Lower control limit
	LWL	Lower warning limit
	AVE	Mean
	UWL	Upper warning limit
	UCL	Upper control limit
		Note: LCL, LWL, AVE, UWL and UCL apply to all QC chart types except LDUP.

Codes For Sample Medium (Matrix, Source)

Medium	Code
All Media, Don't Know or Don't Care	0
Water, Type Unknown or Not Specified	1
Drinking Water	2
Ambient Surface Fresh Water	3
Raw Wastewater	4
Primary Effluent Wastewater	5
Effluent Wastewater (Secondary - Tertiary)	6
Industrial Wastewater	7
Salt, Ocean or Brackish Water	8
Ground Water	9
Leachate	A
Air, Type Unknown or Not Specified	B
Ambient Air	C
Source or Effluent Air	D
Industrial Workroom Air	E
Solids, Type Unknown or Not Specified	F
Bottom Sediment or Deposit	G
Soil	H
Sludge	I
Hazardous Wastes, Dumps	J
Fish, Shellfish Tissue	K
Plants, Algae Tissue	L
Commercial Product Formulation	M
Gasoline	N
Waste Oils	P
Field Sampling Equipment Solvent Washings	Q
Atmospheric Deposition (Direct only)	R

LIST OF SAMPLE and RESULT QUALIFIERS

Definition: A sample qualifier or a result qualifier (also called a non-numeric result) consists of 3 alphanumeric characters which act as an indicator of the fact and the reason that the subject analysis (a) did not produce a numerical result, (b) produced a numeric result but it is qualified in some respect relating to the type or validity of the result or (c) produced a numeric result but for administrative reasons is not to be reported outside the laboratory. Qualifiers related to STORET remarks are indicated in the list below. This list is not intended to be complete, and it is assumed that individual projects will add additional qualifiers to cover project specific circumstances.

Qualifier	Full Name	Definition
BDL	BELOW DETECTABLE LIMITS	There was not a sufficient concentration of the parameter in the sample to exceed the lower detection limit in force at the time the analysis was performed. (No result; STORET "W" remark) Numeric results field, if present, is at best, an approximate value.
FPS	FAILED PRELIMINARY SCREENING	A preliminary screening of the sample for the subject parameter was conducted. The result of the screening indicated that it would not be useful to determine the concentration of the parameter. (No result; no STORET remark)
NSQ	NOT SUFFICIENT QUANTITY	There was not a sufficient quantity of the sample to conduct an analysis to determine the concentration of the subject parameter. (No result; no STORET remark)
LAC	LABORATORY ACCIDENT	There was an accident in the laboratory that either destroyed the sample or rendered it not suitable for analysis. (No result; STORET "O" remark)
FAC	FIELD ACCIDENT	There was an accident in the field that either destroyed the sample or rendered it not suitable for analysis. (No results; no STORET remark)
ISP	IMPROPER SAMPLE PRESERVATION	Due to improper preservation of the sample, it was rendered not suitable for analysis. (No results; no STORET remark code)
PNQ	PRESENT BUT NOT QUANTIFIED	The subject parameter was present in the sample but no quantifiable result could be determined. (No result; STORET "M" remark)
CMP	USED AS PART OF A COMPOSITE	The sample was not analyzed for the subject parameter, instead it was used as part of a composite sample. (No result; STORET "E" remark)

Qualifier	Full Name	Definition
NAI	NOT ANALYZED DUE TO INTERFERENCE	Because of uncontrollable interference the analysis for the subject parameter was not conducted. (No result; no STORET remark)
NAR	NO ANALYSIS RESULT	There is no analysis result required for this subject parameter. (No result; no STORET remark)
PRE	PRESUMPTIVE PRESENCE	Presumptive evidence of presence of material; tentative identification (No result; STORET "N" remark)
UND	ANALYZED BUT UNDETECTED	Indicates material was analyzed for but not detected. (No result; STORET "U" remark)
FQC	FAILED QUALITY CONTROL	The analysis result is not reliable because quality control criteria were exceeded when the analysis was conducted. Numeric field, if present, is estimated value. (Result; no STORET remark, non-reportable; or report with STORET "J" remark)
RNA	RELEASE/REPORT NOT AUTHORIZED	The analysis result is not authorized (by laboratory management) for either forwarding to a National Database or presentation in Engineering tabulations (No STORET remark)
AVG	AVERAGE VALUE	Average value - used to report a range of values (STORET "A" remark)
CNT	NON-ACCEPTABLE COLONY COUNTS	Results based on colony counts outside the acceptable range. (STORET "B" remark)
CAL	CALCULATED RESULT	Calculated result. (STORET "C" remark)
FLD	FIELD MEASUREMENT	Field measurement. (STORET "D" remark)
FEM	FEMALE SEX	In the case of species, indicates female sex. (STORET "F" remark)
KIT	FIELD KIT DETERMINATION	Value based on field kit determination - results may not be accurate. (STORET "H" remark)
EST	ESTIMATED VALUE	Present above detection limit but not quantified within expected limits of precision. (STORET "J" remark)
CAN	CANCELLED	The analysis of this parameter was cancelled and not performed. (No result; no STORET remark)
MAL	MALE SEX	In the case of species, indicates male sex. (STORET "M" remark)

Qualifier	Full Name	Definition
LTL	LESS THAN LOWER DETECTION LIMIT	Actual value is known to be less than value given - lower detection limit. (STORET "K" remark)
GTL	GREATER THAN UPPER DETECTION LIMIT	Actual value is known to be greater than value given - upper detection limit. (STORET "L" remark)
LTC	LESS THAN CRITERIA OF DETECTION	Value reported is less than the criteria of detection (which may differ from instrument detection limits). (STORET "T" remark)
UNK	UNDETERMINED SEX	In the case of species, indicates undetermined sex. (STORET "U" remark)
RET	RETURN(ED) FOR RE-ANALYSIS	The analysis result is not approved by laboratory management and reanalysis is required by the bench analyst with no change in the method. (No STORET remark)
EER	ENTRY ERROR	The recorded value is known to be incorrect but a correct value cannot be determined to enter a correction. (No STORET remark)
REQ	REQUEUE FOR REANALYSIS	The analysis is not approved and must be re-analyzed using a different method. (No STORET remark)
CBC	CANNOT BE CALCULATED	The calculated analysis result cannot be calculated because an operand value is qualified.
LLS	LESS THAN LOWER STANDARD	The analysis value is less than the lower quality control standard. (Result; STORET "J" remark)
MPR	MIDPOINT OF RANGE	The analysis value is the midpoint value of a range of concentrations.
MSL	"EMSL" DETECTION LIMITS	Instrument Detection Limits were computed using a "T" test on two or more calibration samples.
TIE	TENTATIVELY IDENTIFIED - ESTIMATED VALUE	The subject parameter was not in the contract-defined list of parameters to be analyzed for; however its value has been estimated. (No STORET remark)
RIN	RE-ANALYZED	The indicated analysis results were generated from a re-analysis (injection) of the same sample extract or aliquot.
REX	RE-PREPARED	The indicated analysis results were generated from a re-preparation (extraction) of the same sample.

Qualifier	Full Name	Definition
REJ	REJECTED	The analysis results have been rejected for an unspecified reason by the laboratory. For any results where a mean is being determined, this data was not utilized in the calculation of the mean.
SPL	SPLIT RESULTS	The indicated environmental sample or calibration has been split into more than one analysis, and the analysis results will be reported as more than one group of results (multiple type 20 records).
SRN	SPLIT RESULTS - RE-ANALYZED	A combination of "SPL" and "RIN"
SRX	SPLIT RESULTS - RE-PREPARED	A combination of "SPL" and "REX"
STD	INTERNAL STANDARD	The subject parameter is being utilized as an internal standard for other subject parameters in the sample. There is no analysis result to report, although the theoretical and/or limit value(s) may be present.
STB	INTERNAL STANDARD BELOW DETECTION LIMITS	A combination of "STD" and "BDL"
BAC	BACKGROUND CORRECTION	Background correction has been applied to this value.
FBK	FOUND IN BLANK	The subject parameter had a measurable value above the established QC limit when a blank was analyzed using the same equipment and analytical method. Therefore the reported value may be erroneous.
CON	CONFIRMED	The subject parameter has been confirmed using an auxilliary analytical technique as specified in the analytical method.
TFB	TENTATIVELY IDENTIFIED AND FOUND IN BLANK	A combination of "TIE" and "FBK"
ALC	ALDOL CONDENSATION	The indicated compound is suspected by the analyst of being a product of an aldol condensation reaction.
ALT	ALTERNATE MEASUREMENT	The subject parameter was determined using an alternate measurement method. Value is believed to be accurate but could be suspect.
AFB	ALTERNATE AND FOUND IN BLANK	A combination of "ALT" and "FBK"

Appendix C

Example Method and Matrix Codes for Dioxin, General Organic and Inorganic Methods

The codes in Tables 1 and 2 are examples of method number designations for dioxin, general organics and inorganics. In all of these, the Z position refers to the matrix code and should be interpreted with the aid of page B-9. The generic value of 1, which represents "water, type unknown or not specified", is used for water analysis. Each of these generic matrix codes represents a group of specific codes, with Z values of 2 through 9, and A through R.

Solid samples are represented by two specific codes, with Z values of G (bottom sediment or deposit) and H (soil).

Dioxin rinsate samples use the value of Q (field sampling equipment solvent washings).

Each method code shown occurs in a type 10 record and acts as the header for the appropriate list of method analytes.

Method variations are designated by the N position. For example, Method 613 (Table 1) is run in three variations - full scan, partial scan and high resolution.

Table 1

Examples of Method and Matrix Codes for Dioxin and General Organics

XXXX	Y	N	Z	Definition
680	1	1	1	Pesticides and PCBs - water
680	1	1	G	Pesticides and PCBs - sediment
680	1	1	H	Pesticides and PCBs - soil
613	1	1	1	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - water
613	1	1	G	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - sediment
613	1	1	H	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - soil
613	1	1	Q	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - rinsate
613	1	2	1	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - water partial scan
613	1	2	G	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - sediment partial scan
613	1	2	H	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - soil partial scan
613	1	2	Q	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - rinsate partial scan
613	1	3	1	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - water - high resolution scan
613	1	3	G	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - sediment high resolution scan
613	1	3	H	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - soil - high resolution scan
613	1	3	Q	2,3,7,8-Tetrachloro-dibenzo-p-dioxin - rinsate - high resolution scan
624	1	1	1	GC/MS - Purgeables - water, internal/external standard
624	1	1	G	GC/MS - Purgeables - sediment
624	1	1	H	GC/MS - Purgeables - soil
624	1	2	1	GC/MS - Purgeables - isotope dilution - water
625	A	1	1	GC/MS - Acid Fraction - water, internal/external standard
625	B	1	1	GC/MS - Base/Neutral Fraction - water, internal/ external standard
625	C	1	1	GC/MS - combined acid and base/neutral fractions water, internal/external standard
625	C	1	G	GC/MS - combined fractions - sediment
625	C	1	H	GC/MS - combined fractions - soil
625	A	2	1	GC/MS - Acid Fraction - water, isotope dilution
625	B	2	1	GC/MS - Base/Neutral Fraction - water, isotope dilution

Notes:

1. See Page B-1 for the structure of "XXXX" and "Y".

2. For each water sample, the appropriate value of "Z" should replace the generic value of 1.

3. The values of "Z" and "N" are sample dependent and may vary within a production run. They are reported on type 20 and 21 records (pages A-12 and A-14).

Table 2

Examples of Method and Matrix Codes for Inorganics

XXXX	Y	N	Z	Definition
200	4	1	1	Generic code for analysis of total metals in water, after method - defined digestion, by atomic absorption, flame.
200	4	2	1	Generic code for analysis of total metals in water, after method - defined digestion, by atomic absorption, furnace.
200	4	7	1	Generic code for analysis of total metals in water, after method - defined digestion, by ICP.

Note 1: For specific matrix codes, replace Z with specific value for type of sample (from page 3-9), and XXXX with value for metal:

202	Aluminum
204	Antimony
206	Arsenic
208	Barium
210	Beryllium
213	Cadmium
215	Calcium
218	Chromium
219	Cobalt
220	Copper
236	Iron
239	Lead
242	Magnesium
243	Manganese
249	Nickel
258	Potassium
270	Selenium
272	Silver
273	Sodium
279	Thallium
282	Tin
286	Vanadium
289	Zinc

Note 2: Exception to above:

245	1	1	1	Analysis of mercury in water by the manual cold vapor technique.
245	1	2	1	Analysis of mercury in water by the automated cold vapor technique.
245	4	5	G	Analysis of mercury in sediment, after method-defined digestion, by the manual cold vapor technique.

XXXX	Y	N	Z	Definition
245	4	5	H	Analysis of mercury in soil, after method-defined digestion, by the manual cold vapor technique.
245	4	5	I	Analysis of mercury in sludge, after method-defined digestion, by the manual cold vapor technique.
335	1	2	1	Analysis of total cyanide in water by titrimetric, manual spectrophotometric, or semi-automated spectrophotometric means.
335	1	2	G	Analysis of total cyanide in sediment by titrimetric, manual spectrophotometric, or semi-automated spectrophotometric means.
335	1	2	H	Analysis of total cyanide in soil by titrimetric, manual spectrophotometric, or semi-automated spectrophotometric means.

Table 3

Example of the Sequence of Record Types in a Production Run

10 Contains the Run Header information
11 Contains Additional Run-Wide Information as Required.
12
13

20 Occurs once for each sample, calibration, mean response factors, instrument detection limits, etc. - Acts as a header.
21 Will usually be present
22 Contains additional information for samples.

30 Occurs once for each final analytical result. Will give whatever value is being determined as defined by the type 20.
31 Reports any instrumental data necessary.
32 Reports any auxilliary data necessary.
33 Reports component names if necessary.
34 Reports QC Limit information if necessary.
35 Reports Corrections to results if necessary.

30 Values for the next analyte or parameter being measured.
31 Additional data may vary for each parameter, and records
32 may occur in any order. Multiple occurrences of the
32 same record type, however, must be consecutive.
33

30 Continues for as many as are necessary.
31
32
33

30
31
32
33

20 Next Sample Header record - the following applies to the next
21 sample or other group of data.
22
30

31
32
33

30

31
32
33

etc.

20
21

30

31
32
33

etc.